

REMARKS

This Amendment is filed in response to the Office Action mailed on July 12, 2007. All objections and rejections are respectfully traversed.

Claims 6-9, 11-17, 19-20, and 23-53 are currently pending.

Claim 55 is added.

Request for Interview

The Applicant respectfully requests a telephonic interview with the Examiner after the Examiner has had an opportunity to consider this Amendment, but before the issuance of the next Office Action. The Applicant may be reached at 617-951-3067.

Claim Rejections – 35 USC §102

At paragraphs 3 and 4 of the Office Action, claims 6-8, 12-17, 19, 27, 42-43, and 49-54 were rejected under 35 U.S.C. §102 as being anticipated over Nishanov et al., US Patent Application Publication No. 2003/006782, hereinafter Nishanov.

The present invention, as set forth in representative claim 6, comprises in part:

6. A method of claiming ownership of a plurality of disks by a network device in a network storage system, comprising:

writing ownership information to a predetermined area of each disk;

setting a small computer system interface (SCSI) reservation tag for each disk to a state of network device ownership to provide a two part indicia of ownership for each disk, where the two part indicia of ownership are both written to each disk; and

identifying all disks owned by the network device using ownership information written to the predetermined area of each disk of the plurality disks and, for each identified disk, if a mismatch occurs be-

tween the ownership information on the predetermined area of the disk and the ownership defined by the SCSI reservation tag, then using the ownership information written to the predetermined area of the disk as definite ownership data.

By way of background, Nishanov discloses a system for protecting a node's exclusive access to a storage device. Each node is assigned an initiator ID and the initiator ID is mapped to a reservation key in a key table. The reservation key includes three fields, which are a version, ReserveID field, and an OwnerID field. Each reservation key is mapped to a reservation type in a reservation table. The reserve type is configured with a persistent reservation. Each storage device is always registered. When a challenge occurs for ownership of the storage device, a new node writes ownership information to the ReserveID field. The owner then has time to win the challenge by writing its ownership information in the ReserveID field. If the owner writes its ownership information to the ReserveID field before the time is up, then the new node (challenger) loses the challenge. If the owner does not write its ownership information to the ReserveID field before the time is up, then the new node wins the challenge and the new node writes its ownership information into the OwnerID field.

Applicant respectfully urges that Nishanov does not disclose Applicant's claim novel *setting a small computer system interface (SCSI) reservation tag for each disk to a state of network device ownership to provide a two part indicia of ownership for each disk, where the two part indicia of ownership are both written to each disk, and identifying all disks owned by the network device using ownership information written to the predetermined area of each disk of the plurality disks and, for each identified disk, if a*

mismatch occurs between the ownership information on the predetermined area of the disk and the ownership defined by the SCSI reservation tag, then using the ownership information written to the predetermined area of the disk as definite ownership data.

In further detail, Applicant's claimed invention uses two part ownership identification method. The first part of this ownership method is writing of ownership information to a predetermined area of each disk. Within the system, this ownership information acts as the definitive ownership attribute. This predetermined area of the disk can be any known and constant location on each of the disks. The second part of the ownership method is setting of a SCSI reservation to allow only the disk owner to write to the disk. This use of a SCSI reservation allows other servers to read the ownership information from the disks. Additionally, the ability to change the SCSI reservation tag to match the ownership information stored in the predetermined area of disk allows a storage server to configure the disks into the appropriate RAID groups and or volumes. The ownership information stored on the storage device (sector S) is the controlling ownership information on the disk. When a mismatch occurs between the ownership information stored in the predetermined sector and the SCSI reservation, the SCSI reservation is changed to show the same owner that is in the predetermined sector of the disk.

In contrast, Nishanov discloses a reservation key with two identifying fields, the OwnerID field and the ReserveID field. There is no disclosure in Nishanov that the ReserveID field is a SCSI reservation tag, as Applicant claims as one indicia of ownership. The ReserveID field in Nishanov is written to the storage device in the reserve table and the key table. Nishanov discloses using the persistent reservation for stating a type of reservation but not for identifying the ownership node. (The reservation is mapped to the reservation key.) Furthermore, Nishanov uses the ReserveID field for challenging ownership, or in other words for a new node to take over. In contrast, Applicant's invention

changes the SCSI reservation tag if it does not match the ownership information stored in the predetermined area because the ownership information stored in a predetermined area is the controlling ownership information. Applicant's invention will change the persistent reservation tag for example when checking which disks that a network device (node) owns. Applicant's invention does not need a challenge from a new or second node to revise the SCSI reservation tag.

Accordingly, Applicant respectfully urges that Nishanov is legally insufficient to anticipate the present claims under 35 U.S.C. §102 because of the absence of the Applicant's claimed novel *setting a small computer system interface (SCSI) reservation tag for each disk to a state of network device ownership to provide a two part indicia of ownership for each disk, where the two part indicia of ownership are both written to each disk, and identifying all disks owned by the network device using ownership information written to the predetermined area of each disk of the plurality disks and, for each identified disk, if a mismatch occurs between the ownership information on the predetermined area of the disk and the ownership defined by the SCSI reservation tag, then using the ownership information written to the predetermined area of the disk as definite ownership data.*

Claim Rejections – 35 USC § 103

At paragraph 7 of the Office Action, claims 20, and 23-25 were rejected under 35 U.S.C. §103 as being unpatentable over Nishanov, in view of Carlson et al., US Patent Application Publication No. 2003/0093501, hereinafter Carlson.

The present invention, as set forth in representative claim 20, comprises in part:

20. A network storage system comprising:
one or more switches interconnected to form a switching fabric;
a plurality of disks, each of the disks connected to at least one of the switches, each disk storing a first ownership attribute to a predetermined area of a disk and each disk associated with a second ownership attribute in the form of a small computer system interface reservation;
and
one or more network devices, interconnected with the switching fabric, each of the network devices being configured to own a predetermined set of disks of the plurality of disks through use of the first and second ownership attributes ,wherein each network device identifies all disks owned by the network device using ownership information written to the predetermined area of each disk of the plurality disks and, for each identified disk, if a mismatch occurs between the ownership information on the predetermined area of the disk and the ownership defined by the SCSI reservation tag, then using the ownership information written to the predetermined area of the disk as definite ownership data.

By way of background, Carlson discloses a Storage Area Network (SAN) where storage devices are interconnected by switches to form a fabric. See paragraph 0039.

Applicant respectfully urges that Nishanov and Carlson taken alone or in combination do not teach or suggest Applicant's claimed novel *a plurality of disks, each of the disks connected to at least one of the switches, each disk storing a first ownership attribute to a predetermined area of a disk and each disk associated with a second ownership attribute in the form of a small computer system interface reservation* and *one or more network devices, interconnected with the switching fabric, each of the network devices being configured to own a predetermined set of disks of the plurality of disks through use of the first and second ownership attributes ,wherein each network device identifies all disks owned by the network device using ownership information written to the predetermined area of each disk of the plurality disks and, for each identified disk,*

if a mismatch occurs between the ownership information on the predetermined area of the disk and the ownership defined by the SCSI reservation tag, then using the ownership information written to the predetermined area of the disk as definite ownership data.

As stated above, Nishanov discloses a reservation key with two identifying fields, the OwnerID field and the ReserveID field. There is no disclosure in Nishanov that the ReserveID field is a SCSI reservation tag, as Applicant claims as one indicia of ownership. The ReserveID field in Nishanov is written to the storage device in the reserve table and the key table. Nishanov discloses using the persistent reservation for stating a type of reservation but not for identifying the ownership node. (The reservation is mapped to the reservation key.) Furthermore, Nishanov uses the ReserveID field for challenging ownership, or in other words for a new node to take over. In contrast, Applicant's invention changes the SCSI reservation tag if it does not match the ownership information stored in the predetermined area because the ownership information stored in a predetermined area is the controlling ownership information. Applicant's invention will change the persistent reservation tag for example when checking which disks that a network device (node) owns. Applicant's invention does not need a challenge from a new or second node to revise the SCSI reservation tag.

Additionally, Carlson does not disclose nor suggest using a SCSI reservation tag of a network device, as claimed by Applicant.

Accordingly, Applicant respectfully urges that the combination of Nishanov and Carlson is legally insufficient to make obvious the present claims under 35 U.S.C. §103 because of the absence of the Applicant's claimed novel *a plurality of disks, each of the*

disks connected to at least one of the switches, each disk storing a first ownership attribute to a predetermined area of a disk and each disk associated with a second ownership attribute in the form of a small computer system interface reservation and one or more network devices, interconnected with the switching fabric, each of the network devices being configured to own a predetermined set of disks of the plurality of disks through use of the first and second ownership attributes ,wherein each network device identifies all disks owned by the network device using ownership information written to the predetermined area of each disk of the plurality disks and, for each identified disk, if a mismatch occurs between the ownership information on the predetermined area of the disk and the ownership defined by the SCSI reservation tag, then using the ownership information written to the predetermined area of the disk as definite ownership data.

At paragraph 8, of the Office Action, claim 26 was rejected under 35 U.S.C. §103 as being unpatentable over Nishanov, in view of Carlson, and in further view of Jaskiewicz et al., US Patent Application Publication 2003/0061491, hereinafter Jaskiewicz.

Applicant respectfully notes that claim 26 is a dependent claim that depends from an independent claim which is believed to be in condition for allowance. Accordingly, claim 26 is believed to be in condition for allowance.

At paragraphs 9 of the Office Action, claims 28 and 34-36 were rejected under 35 U.S.C. §103 as being unpatentable over Brunelle et al., US Patent No. 6,654,902, issued on Nov. 25, 2003, hereinafter Brunelle, in view of Nishanov.

The present invention, as set forth in representative claim 28, comprises in part:

28. A method for a network device to manage ownership of one or more storage devices in a network storage system, comprising:
 reading ownership information from a predetermined area of each storage device;
 in response to reading the ownership information, creating an ownership table that identifies the one or more storage devices owned by the network device;
 reading a small computer system interface (SCSI) reservation tag from each storage device;
 comparing the SCSI reservation tag to the ownership information of the same storage device and, if there is not a match, changing the SCSI reservation tag to match the ownership information; and
 configuring the one or more storage devices identified in the ownership table into at least one volume for use by the network device.

By way of background, Brunelle discloses a way of using standard small computer system interface (SCSI) persistent reservations with I/O barriers. The American National Standards Institute (ANSI) has standardized a number of SCSI Persistent Reservation commands, such as *Persistent Reserve Out*. See col. 1, lines 28-41. Brunelle describes issuing two of these commands to assign ownership to storage devices. See col. 5, lines 60-67. The first *Persistent Reserve Out* command includes a key describing a particular node owning the device. See col. 6, lines 38-48. The second *Persistent Reserve Out* command includes a parameter specifying an access type, such as “write exclu-

sive read only.” See col. 5, lines 65-67 and col. 6, lines 48-54. Additionally, Brunelle describes writing registration information each time a node is initialized or changed.

Applicant respectfully urges that Brunelle and Nishanov, taken alone or in combination, do not teach or suggest Applicant’s claimed novel *comparing the SCSI reservation tag to the ownership information of the same storage device and, if there is not a match, changing the SCSI reservation tag to match the ownership information*.

There is no disclosure in Brunelle of changing the SCSI reservation tag of a first network device to match the ownership information stored in the predetermined sector that identifies the first network device. Applicant’s device is matching the two part indicia of ownership using the ownership information stored in the predetermined sector as the definite ownership.

Additionally, Nishanov discloses a reservation key with two identifying fields, the OwnerID field and the ReserveID field. There is no disclosure in Nishanov that the ReserveID field is a SCSI reservation tag, as Applicant claims as one indicia of ownership. The ReserveID field in Nishanov is written to the storage device in the reserve table and the key table. Nishanov discloses using the persistent reservation for stating a type of reservation but not for identifying the ownership node. (The reservation is mapped to the reservation key.) Furthermore, Nishanov uses the ReserveID field for challenging ownership, or in other words for a new node to take over. In contrast, Applicant’s invention changes the SCSI reservation tag if it does not match the ownership information stored in the predetermined area because the ownership information stored in a predetermined area is the controlling ownership information. Applicant’s invention will change the persistent reservation tag for example when checking which disks that a network device (node)

owns. Applicant's invention does not need a challenge from a new or second node to revise the SCSI reservation tag. There is no suggestion in Nishanov to change a SCSI reservation because Nishanov does not use the SCSI reservation to store node identification. Instead Nishanov teaches away of using the persistent reservation for the type of access.

Accordingly, Applicant respectfully urges that the combination of Nishanov and Brunelle is legally insufficient to make obvious the present claims under 35 U.S.C. §103 because of the absence of the Applicant's claimed novel *comparing the SCSI reservation tag to the ownership information of the same storage device and, if there is not a match, changing the SCSI reservation tag to match the ownership information*.

All independent claims are believed to be in condition for allowance.

All dependent claims are believed to be dependent from allowable independent claims.

The Applicant respectfully solicits favorable action.

Please charge any additional fee occasioned by this paper to our Deposit Account
No. 03-1237.

Respectfully submitted,

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